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ROSS, Andrew L.

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### *The State of U.S. Defense Innovation*

Andrew L. ROSS

University of New Mexico

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Despite the dismay occasioned by self-inflicted budgetary wounds, U.S. defense innovation—whether technological, organizational, or doctrinal—remains imposing. Its defense innovation system and the broader national innovation system within which it is embedded are formidable. Both the public and private sectors of the U.S. defense innovation enterprise are robust.<sup>1</sup> Defense agency and service defense research, development, test, and evaluation (RDT&E) programs support a daunting array of science and technology (S&T) and weapons development activities. Information technologies are being harnessed and leveraged. Conventional and nuclear capabilities alike are being modernized. New organizations have been stood up. New operational concepts and capabilities have been, and are being, developed, demonstrated, and employed. Private sector defense industrial research, development and manufacturing capabilities are unrivaled.<sup>2</sup> It should not be assumed that U.S. military preeminence and command of the commons will soon be eroded. Attempts by other countries to close the military gap with the United States may yield limited gains in particular niches, but the United States will not confront a military peer, near-peer, or a militarily competitive coalition or alliance in the near- to mid-term if national security and defense planners effectively and efficiently utilize the resources and capabilities at their disposal.

This paper provides a high-level snapshot of current U.S. defense innovation, a brief examination of austerity and its implications for defense innovation, and an overview of the post-Operation Desert Storm/“shock and awe” debate among revolutionaries, transformers, reformers, and modernizers.

### Snapshot of U.S. Defense Innovation Today

Current U.S. defense innovation programs are informed by a strategic focus—whether a return, pivot, or rebalancing—on Asia-Pacific and the Middle East, the AirSea Battle operational concept, and the shift from post-9/11 counterterrorism and counterinsurgency operations, which required “sizing U.S. forces for prolonged, large-scale stability operations” (a la Afghanistan and Iraq), to “a smaller, learner force that is agile, flexible, and ready to

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1 The United States ranked fifth in the Global Innovation Index 2013; China came in at 35, Russia, 62, and India, 66. <http://www.globalinnovationindex.org/content.aspx?page=GII-Home>; According to Tyler Cowen, it is the United States that is best positioned to prosper in the new economy. Tyler Cowen, “Who Will Prosper in the New World,” *New York Times*, August 31, 2013, [http://opinionator.blogs.nytimes.com/2013/08/31/who-will-prosper-in-the-new-world/?\\_r=0](http://opinionator.blogs.nytimes.com/2013/08/31/who-will-prosper-in-the-new-world/?_r=0).

2 U.S. firms have continued to dominate the *Defense News* Top 100. In the most recent rankings, 7 of the top 10 and 16 of the top 25 defense firms, by revenue, were American. “*Defense News* Top 100 Special Report,” *Defense News*, July 22, 2013, 11–25.

*deploy quickly*.”<sup>3</sup> The emphasis for this down-sized and restructured “Joint Force in 2020” is to be on multi-mission, rapidly deployable, self-sustaining, power-projection forces, particularly long-range airpower (bombers), carrier strike groups, and submarines. This force is to possess capabilities to support a full spectrum of missions and “the ability to deter, fight, and win multiple conflicts in multiple regions with overlapping timeframes.”<sup>4</sup> New technology development is to be focused on confronting “the most lethal and disruptive threats of the future.”<sup>5</sup> A set of six “*protected and prioritized key investments in technology and new capabilities*” that span the hardware (technology) and software (organization and doctrine) dimensions of defense innovation have been identified:<sup>6</sup>

1. Cyber security
  - Cyber teams to:
    - Defend defense/military networks
    - Degrade adversary cyber capabilities (aka offense)
    - Support civil authorities in the defense of national infrastructure
2. Space
  - Defense
  - Degrade enemy space capabilities (aka offense)
  - “Ability to ‘operate through’ a contested environment”
3. Airborne Intelligence, Surveillance, and Reconnaissance (AISR)
  - Sea-based platforms
  - Extended-range, land-based platforms
4. Resilient Command, Control, and Communications (C3)
5. Industrial base
  - Enhanced capabilities for “resiliency and responsiveness in critical technology, development, and production”
6. Energy

In the nuclear realm, the United States remains committed to maintaining a safe, secure, and effective nuclear deterrent even as it claims to be reducing the role of nuclear weapons in its national security strategy. An across-the-board modernization of the nuclear triad is underway: rebuilds of intercontinental and submarine-launched ballistic missiles; upgrades of long-range bombers; development of new platforms, including a new ballistic missile submarine and long-range penetrating bomber; and a warhead Life Extension Program.<sup>7</sup> A new nuclear employment strategy

3 AirSea Battle is an operational innovation. See the joint *Air-Sea Battle: Service Collaboration to Address Anti-Access and Area Denial Challenges*, May 2013, <http://www.defense.gov/pubs/ASB-ConceptImplementation-Summary-May-2013.pdf>; and Andrew F. Krepinevich, *Why AirSea Battle?* (Washington, DC: Center for Strategic and Budgetary Assessments, 2010). Quote from Department of Defense, *Defense Budget Priorities and Choices Fiscal Year 2014*, April 2013, 5, <http://www.defense.gov/pubs/DefenseBudgetPrioritiesChoicesFiscalYear2014.pdf>. Italics in the original.

4 Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *Overview: United States Department of Defense Fiscal Year 2014 Budget Request*, April 2013, 2-3. The portfolio of military missions is provided on 2-4-2-6. Notably, power projection in the face of anti-access/area denial (A2/AD) merited mission status.

5 DoD, *Defense Budget Priorities and Choices FY 2014*, 5.

6 Drawn from DoD, *Defense Budget Priorities and Choices FY 2014*, 5, 12, 14.

7 Brian Everstine, “STRATCOM Chief: Upgrades Needed for Nuclear Weapon Arsenal, Global Strike Fleets,” *airforcetimes.com*, July 24, 2013, <http://www.airforcetimes.com/article/20130724/NEWS04/307240030/STRATCOM-chief-Upgrades-needed-nuclear-weapon-arsenal-Global-Strike-fleets>; Elaine Grossman, “Top U.S. Nuclear Commander Eyes More Trident Subs, Not Less,” *Global Security News-wire*, June 17, 2013, <http://www.nti.org/gsn/article/top-us-nuclear-commander-eyes-more-trident-subs-not-less/>.

was unveiled in June 2013.<sup>8</sup> Despite plans to further reduce the number of deployed weapons, the vast U.S. nuclear weapons research, development, and production complex is undergoing modernization as well.

The United States remains doggedly committed to the development and deployment of ballistic missile capabilities focused on “threats from Asia-Pacific and the Middle East.”<sup>9</sup> The Ground-based Midcourse Defense (GMD) system is to be maintained and improved. Despite the lack of a successful test intercept since 2008, the number of Ground Based Interceptors (GBI) fielded at Fort Greely in Alaska is to be increased from 30 to 44.<sup>10</sup>

Notably, the Asia rebalance “will influence DoD’s investments in force structure, capabilities, posture, operational concepts and engagement in the region.” Specifically, priority has been assigned to “investments that develop platforms and capabilities that have direct applicability and use in the Asia-Pacific region” and will ensure that U.S. forces will “maintain regional access and the ability to operate freely, including where our power projection operations are challenged by adversaries.” All of the services have embraced the counter anti-access/area denial (A2/AD) mission as part of their mission sets. Investments intended to support the Asia rebalance include:<sup>11</sup>

- Joint Strike Fighter (F-35)
- New stealth bomber
- KC-46 tanker replacement
- Broad Area Maritime Surveillance (BAMS)
- Virginia-class nuclear submarine
- P-8 maritime patrol aircraft
- Cruise missiles
- ISR (intelligence, surveillance, and reconnaissance) platforms
- Additional “future-focused capabilities”
  - Cyber
  - S&T
  - Space

The F-35, a fifth-generation fighter, is to be deployed first in the Pacific, at bases in Japan and the Republic of Korea, upon achieving initial operational capability.<sup>12</sup>

Investments in the Asia rebalance include S&T and doctrinal/operational components as well. A2/AD was highlighted as an S&T focus for FY 2014. Indeed, S&T requirements for several missions that support the rebalance were emphasized for FY 2014:

- Power projection in the face of A2/AD challenges
- Counter weapons of mass destruction
- Cyberspace and space operations
- Electronic warfare
- High-speed kinetic strike

<sup>8</sup> Department of Defense, *Report on Nuclear Employment Strategy of the United States*, June 19, 2013, [http://www.defense.gov/pubs/ReporttoCongressonUSNuclearEmploymentStrategy\\_Section491.pdf](http://www.defense.gov/pubs/ReporttoCongressonUSNuclearEmploymentStrategy_Section491.pdf).

<sup>9</sup> *Overview: U.S. Department of Defense FY 2014 Budget Request*, 3-3.

<sup>10</sup> “Critical Long-Range Missile Intercept Test Fails to Take Out Target,” *Global Security Newswire*, July 8, 2013, <http://www.nti.org/gsn/article/critical-long-range-missile-intercept-test-fails-take-out-target/>.

<sup>11</sup> *Overview: U.S. Department of Defense FY 2014 Budget Request*, 2-6, 2-7.

<sup>12</sup> Colin Clark, “China Will Soon Face Arc of US F-35s, Other Fighters, Bombers,” *BREAKINGDEFENSE.COM*, July 29, 2013, <http://breakingdefense.com/2013/07/29/china-will-soon-face-arc-of-us-f-35s-other-fighters-bombers/>.

Approximately 39 percent of proposed S&T spending for FY 2014 is targeted at this mission set.<sup>13</sup> On the doctrinal front, “DoD is dedicating significant attention to understanding how to gain access to and operate in denied areas, including developing new operational concepts...”<sup>14</sup>

## An Age of Austerity?

In January 2012, when a proposed \$613.4 billion FY 2013 defense budget was unveiled, it was the \$259 billion in cuts over five years—\$487 billion over ten years—that provoked alarm. The cuts were more apparent than real. They amounted, essentially, to cuts in projected future increases in defense spending. Defense spending was actually to remain fairly steady, declining by a total of only 1.6 percent over five years. Now, of course, it is the Budget Control Act’s sequester, which took effect on March 1, 2013, and its mandated cuts—\$37 billion in FY 2013, an estimated \$52 billion for FY 2014, and \$500 billion over ten years—that has much of the U.S. defense establishment quaking in its combat boots.

Sequester has been characterized as insidious, devastating, disastrous, catastrophic, a sledgehammer, a budgetary Pearl Harbor, a doomsday machine. U.S. Secretary of Defense Chuck Hagel has pointed out that the effects of the initial round of cuts alone—the \$37 billion in the current fiscal year—included “halting all flying for some Air Force squadrons, canceling ship deployments, ending Army Combat Training Center rotations for brigades not deploying to Afghanistan, and imposing furloughs for 650,000 DoD civilians.”<sup>15</sup> Left unchecked, sequester cannot but have a far-reaching effect on the department’s operation and maintenance, military personnel, procurement, and RDT&E accounts. End strength and force structure will be reduced. Not only current but future readiness may be eroded.

The pain of sequestration, with its essentially indiscriminate, across-the-board cuts, is real. But despite the travails of sequestration, America’s hard power and soft power alike will remain intact. Defense spending will decline but it will still be higher than it was before the post-9/11 buildup and higher than it was during much of the Cold War, when the United States confronted a more formidable threat than it does today.<sup>16</sup> The United States will remain the world’s sole full-service superpower, its preeminent military power. Indeed, America’s military preponderance is quite marked. It is the only military power with 24/7 global reach. It has no military equals or rivals; there is no peer, or even near-peer, competitor. Despite the chronic alarmism exhibited by the likes of DoD’s Office of Net Assessment, it is not clear that there are any serious global military contenders on the rise.

The military preponderance of the United States is founded upon a full spectrum of conventional and nuclear capabilities. Its networked conventional air and space (or aerospace), naval, and ground forces are unmatched, as are its C4ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance) and systems integration capabilities. Its military personnel are highly skilled, experienced, and accomplished in joint and combined operations. These capabilities will continue to be sustained by a defense innovation enterprise that is broader and deeper than that found anywhere else.

A United States that has been spending more on defense than much of the rest of the world combined will not be rendered an ordinary country by sequestration. The United States accounts for around 40 percent of world

13 *Overview: U.S. Department of Defense FY 2014 Budget Request*, 3-9.

14 *Ibid.*, 2-7.

15 Secretary of Defense Chuck Hagel, “Statement on Strategic Choices and Management Review,” July 31, 2013, <http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1798>.

16 According to CSBA’s Todd Harrison, sequestration “would return the base defense budget to roughly the same level it was in FY 2007....” Todd Harrison, “Strategy in a Year of Fiscal Uncertainty,” CSBA Backgrounder (Washington, DC: Center for Strategic and Budgetary Assessments, February 2012), 5.

military spending.<sup>17</sup> Its defense expenditures are larger than those of the next fourteen of the International Institute for Strategic Studies' top fifteen defense spenders (and eleven of the fourteen are U.S. allies or friends). China's military spending is on the rise, but the United States outspends China by more than 4 to 1 according to SIPRI data and more than 6 to 1 according to IISS data.<sup>18</sup> It outspends Russia by more than 7 to 1 according to data from the Stockholm International Peace Research Institute (SIPRI) and by 10 to 1 according to IISS data. Of no little import, U.S. defense spending on RDT&E, an investment in—and indication of—future capabilities on the order of roughly \$73 billion annually, until quite recently has been more than any other country has spent on defense. While China's annual defense expenditures now exceed U.S. RDT&E expenditures, the United States still spends more on RDT&E than any country other than China spends on defense. Even if U.S. RDT&E spending is cut by an anticipated \$6 billion, the United States will still be spending more on RDT&E than any country except China spends on defense.

Sequestration unchecked can be expected to result in a somewhat smaller U.S. military. Army end strength, both the active and reserve components, is likely to be further downsized. There may well be additional reductions in Marine Corps end strength. The number of aircraft carriers, and carrier strike groups, could be reduced from eleven to eight or nine. But that would still leave the U.S. Navy with eight or nine times as many aircraft carriers as the People's Liberation Army Navy (PLAN). And while the PLAN is learning how to operate its first carrier, the refurbished ex-Ukrainian, ex-Soviet *Liaoning*, with its cutting-edge 1980s technology, the U.S. Navy is experimenting with the integration of an unmanned aircraft, the X-47B, into carrier operations.<sup>19</sup>

Sequestration-induced austerity will not leave the U.S. defense innovation enterprise dead in the water. It could well be a boon to innovation. In his discussion of the Strategic Choices and Management Review (SCMR), Secretary Hagel posed a seemingly stark choice: “trade away size for high-end capability”—a smaller but “technologically dominant” force—or “trade away high-end capability for size”—and go on “a decade-long modernization holiday.” As framed by Hagel, however, the choice to be made appears clear—especially if America's leaders heed the counsel of former Secretary of Defense Robert Gates: “[A]ny future defense secretary who advises the president to again send a big American land army into Asia or into the Middle East or Africa should ‘have his head examined,’ as General MacArthur so delicately put it.”<sup>20</sup> All of which would seem to bring us back to the future—to the transformation enterprise.

## Transformation Is Dead; Long Live Transformation

Since the early 1990s, discussions of and debates surrounding U.S. defense innovation have been informed and shaped by notions of a military-technological revolution (MTR), a revolution in military affairs (RMA), particularly an information technology revolution in military affairs (IT-RMA), and transformation. For some, the performance of the U.S. military during Operation Desert Storm indicated—confirmed even—that an MTR or RMA had already occurred, or was at least well underway. For others, that performance was an indication of the promise of an emerging RMA that had yet to be fully realized. The task for national security and defense planners was to bring about that RMA.

17 According to Peter Singer, even with sequestration U.S. military spending would still account for 38 percent of total world military spending. Peter Singer, “Separating Sequestration Facts from Fiction,” Part II, “Defense Sequestration and America's Military Spending Compared to the World,” September 23, 2012, <http://www.brookings.edu/research/articles/2012/09/defense-sequestration-american-military-spending>.

18 These military spending comparisons are drawn from International Institute for Strategic Studies, *The Military Balance 2013* (London: Routledge, 2013); and Sam Perlo-Freeman, Elisabeth Sköns, Carina Solmirano and Helén Wilandh, *Trends in World Military Expenditure, 2012*, SIPRI Fact Sheet, April 2013.

19 I am indebted to Dick Bitzinger for this characterization.

20 Secretary of Defense Robert M. Gates, speech at the U.S. Military Academy, West Point, NY, February 25, 2011, <http://www.defense.gov/speeches/speech.aspx?speechid=1539>.

During the course of the 1990s, the campaign for a RMA, specifically an IT-RMA, evolved into the transformation enterprise, which appeared to have had its heyday during the first half of the first decade of the twenty-first century.<sup>21</sup> Despite the presence of prominent civilian and military champions of an RMA/transformation and the appearance of RMA concepts and language in service documents during the early 1990s, the campaign did not immediately gain traction. After all, the United States had emerged victorious from both the Cold War and the 1991 Gulf War. It was the world's sole superpower, its military predominant and seemingly unchallengeable. Why revolutionize or transform the world's preeminent military establishment? For skeptics, modernization, perhaps reform, would be sufficient to ensure continued U.S. military supremacy. That logic was apparent in both the Base Force of 1992 and the Bottom-Up Review of 1993, which were devoid of revolutionary and transformational designs, of any recognition that the U.S. military might need to be remade. Transformation was more prominently featured in DoD's 1997 quadrennial defense review (QDR), but it embraced modernization and reform rather than transformation.

The tipping point for the transformation enterprise was provided by the *National Defense Panel's Transforming National Defense: National Security in the 21st Century*, a congressionally-mandated external review of the 1997 QDR that unequivocally embraced the RMA and transformation. Transformation was placed front and center. The NDP asserted that the U.S. military did not possess the capabilities that it needed for the future, that Cold-War legacy systems had limited utility, that future readiness should be assigned a higher priority than current readiness, and that, as emphasized in the Joint Staff's 1996 *Joint Vision 2010*, the exploitation of advances in information technologies was central to transformation. Information systems architecture, information operations and infrastructure protection, automation, mobility, stealth, speed, and precision strike capabilities would be critical for the future.

With the September 2001 *Quadrennial Defense Review Report* DoD declared that it was all in: "[I]t is imperative that the United States invests and transforms its forces and capabilities."<sup>22</sup> An Office of Force Transformation was stood up in the Office of the Secretary of Defense. A flood of transformation visions, guidance, and road maps joined the Joint Staff's 2000 foundation document *Joint Vision 2020*, which reiterated *Joint Vision 2010*'s emphasis on the massing of effects rather than forces, information superiority, technological innovation, and the emerging operational concepts of dominant maneuver, precision engagement, focused logistics, and full-dimensional protection.<sup>23</sup> Within OSD, the Joint Staff, and across the functional and regional commands and military services the rhetoric, if not necessarily the reality, of transformation was ubiquitous. Systems of systems, networks of networks, networked nodes, network centric warfare, network centric operations, effects-based operations, swarming, advanced command, control, communications, computing, and intelligence (C4I) and precision strike were all the rage.

The characterizations of transformation (a not unambiguous concept) advanced in the 2001 QDR and the subsequent *Transformation Planning Guidance* encompassed all three components of defense innovation: technology, doctrine, and organization. In the words of the 2001 *Quadrennial Defense Review Report*,

Transformation results from the *exploitation of new approaches to operational concepts and capabilities*, the use of old and new technologies, and *new forms of organization* that more effectively anticipate new or still emerging strategic and operational challenges and opportunities and that *render previous methods of conducting war obsolete or subordinate*. Transformation can involve *fundamental change in the form of military operations*, as well as a potential change in their scale.

21 For more on the transformation enterprise, see Peter Dombrowski and Andrew L. Ross, "The Revolution in Military Affairs, Transformation, and the Defense Industry," *Security Challenges* 4 (2008): 13–38; Peter Dombrowski and Andrew L. Ross, "The Revolution in Military Affairs, Transformation, and the U.S. Defense Industry," in Richard A. Bitzinger, ed., *The Modern Defense Industry: Political, Economic, and Technological Issues* (Santa Barbara, CA: Praeger Security International, 2009), 153–74; Steven Metz, "America's Defense Transformation: A Conceptual and Political History," *Defence Studies* 6 (2006): 1–25; and Harvey M. Sapolsky, Benjamin H. Friedman, and Brendan Rittenhouse Green, eds., *U.S. Military Innovation Since the Cold War: Creation Without Destruction* (London: Routledge, 2009).

22 Department of Defense, *Quadrennial Defense Review Report* (Washington, DC: Department of Defense, 2001), 40.

23 [http://www.fs.fed.us/fire/doctrine/genesis\\_and\\_evolution/source\\_materials/joint\\_vision\\_2020.pdf](http://www.fs.fed.us/fire/doctrine/genesis_and_evolution/source_materials/joint_vision_2020.pdf).

It can encompass the *displacement of one form of war with another*, such as *fundamental change in the ways war is waged* in the air, on land and at sea. It can also involve the *emergence of new kinds of war*, such as armed conflict in *new dimensions of the battlespace*.<sup>24</sup>

The 2003 *Transformation Planning Guidance* depicted transformation as

a process that shapes the changing nature of military competition and cooperation through *new combinations of concepts, capabilities, people, and organizations* that exploit our nation's advantages and protect against our asymmetric vulnerabilities to sustain our strategic position.<sup>25</sup>

This transformation process, furthermore, included “redefining standards for military success by accomplishing missions that were previously unimaginable or impossible” and the development of “new operating concepts that employ new organizational constructs, capabilities, and doctrine.”<sup>26</sup> According to its advocates, the process of transformation would realize the RMA's strategic and operational promise. There was talk of disruptive, revolutionary innovation rather than incremental, sustaining change, skipping generations of technology, jumping to the next S-curve, risk taking, breaking eggs to make an omelet.

Transformation's champions foresaw an array of novel capabilities enabled by new and emerging technologies, particularly information technologies, the key enabler. A transformed U.S. military would feature networked nodes (platforms, weapons, sensors, C4ISR assets); distributed (rather than concentrated) forces and capabilities; light, agile, nimble, fast, expeditionary forces; precision engagement; real-time shared situational awareness; flexible, adaptable, modular, stealthy platforms and forces; truly joint (interdependent and integrated), interoperable, and sustainable forces. The enterprise was to deliver everything from a battlespace saturated with sensors and unmanned systems to hypersonic vehicles; new forms of kinetic energy; smaller, faster, lighter naval vessels; and sea basing. Military operations would increasingly be network- rather than platform-centric. Platforms would be tailored to the network rather than networks to platforms. Networked capabilities, including forces, would be distributed rather than concentrated. Fires, not forces, would be massed. Information and cyber operations would not merely support but rival, if not supplant, conventional military operations. Bits and bytes rather than bullets and bombs would be the coin of the realm. “Hardware” would be as much about IT hardware as about traditional military hardware, which would be dependent upon software for its effectiveness. Information architecture would require as much attention from force planners as force structure. Lancaster's equations would be relegated to the dustbin of history; Moore's Law and Metcalf's Law would rule. Warfighters would demand more bandwidth rather than more throw weight. Processing power would rival if not displace explosive yield in significance. The collection, processing, fusion, and dissemination of data would be the new logistics.

Transformation's seemingly disruptive vision of the future was itself disrupted by its champions' often overblown claims, the promiscuous use of “transformation,” counterrevolutionary resistance, and the reality of military requirements after 9/11. Upon closer inspection, new and emerging technologies characterized as transformational were revealed to be less disruptive than sustaining. Operational concepts associated with transformation were either less than novel or underdeveloped, half-baked even. At best, transformation amounted to modernization-plus.<sup>27</sup> Increasingly, the label “transformational” was slapped on virtually anything and everything on agency and service wish lists. Consequently the term was devalued—if everything was transformational, nothing was—and the enterprise undermined. Counterrevolutionary skeptics, civilian and military alike, resisted what they regarded as an illusory vision—one that promised to upend the existing order and their place in it and dismissed the demonstrated effectiveness of the “legacy” capabilities that had enabled the U.S. military to defeat Iraqi forces so quickly and

24 DoD, *Quadrennial Defense Review Report*, 29. Emphasis added.

25 Department of Defense, *Transformation Planning Guidance* (Washington, DC: Department of Defense, 2003), 3. Emphasis added.

26 DoD, *Transformation Planning Guidance*, 3–4.

27 A number of these points were made in Peter J. Dombrowski and Andrew L. Ross, “Transforming the Navy: Punching a Featherbed?” *Naval War College Review* 56, No. 3 (2003): 107–31.



decisively and then to dispatch regimes in Afghanistan and Iraq after 9/11 in such short order. The military that brought you “shock and awe” must be rebuilt, transformed? Modernization and reform would not suffice? Really?<sup>28</sup>

As the focus of military operations in Afghanistan and Iraq shifted from regime change to counterinsurgency, for some the focus of transformation shifted also—from major power, or at least state-centric, “proper wars” to counterinsurgency (COIN). A military that had been raised, trained, and equipped to fight a Cold War superpower and its allies was once again called upon to fight a quite different war. Once again it wasn’t ready. Once again it became apparent that COIN wasn’t simply a lesser included case. The hardware, doctrine, and organization regarded as optimal for a Cold War clash of the United States and the Soviet Union, NATO and the Warsaw Pact, were not well suited for the post-regime-change operational challenges of Afghanistan and Iraq. The U.S. military, or at least its ground forces, was compelled to adapt. Most famously, FM 3-24, the U.S. Army/Marine Corps COIN manual, was rewritten at the Army Command and Staff College at Fort Leavenworth.<sup>29</sup>

A transformation vision that privileged the military after next gave way to the needs of today’s military, a military at war. An emphasis on future readiness yielded to the requirement for current readiness. The focus for innovation, whether transformational or not, was on technological, doctrinal, and organizational adaptation for counterterrorism and counterinsurgency operations.<sup>30</sup> A U.S. military at war needed counter-IED capabilities and effective counterterrorism and COIN doctrine. What did the transformation enterprise offer? It seemed to have faded from the scene.

Yet transformation is back, H. R. McMaster tells us, resurrected, given new life by budget pressures and the desire, given voice by former Secretary of Defense Gates and others, to avoid future Afghanistans and Iraqs.<sup>31</sup> In reality, it had never really gone away. Instead, it had been institutionalized and routinized. It had become routine, standard operating procedure, yet omnipresent. Though no longer front and center as the Afghan and Iraq conflicts dragged on, and certainly no longer as noisily and feverishly promoted as it had been, transformation has nonetheless persisted. In the “Defense Strategic Guidance” (DSG) of 2012, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, the secretary of defense called for a future force that is to be “smaller and leaner,” “agile, flexible, ready, and technologically advanced,” and have “cutting edge capabilities, exploiting our technological, joint, and networked advantage.”<sup>32</sup> The concepts and language of transformation are evident as well in the SCMR, which is to inform the 2014 QDR, DoD budget documents, and joint and service visions and plans. DARPA’s research portfolio, managed by its defense sciences, information innovation, microsystems technology, strategic technology, and tactical technology offices and intended “to prevent strategic surprise from negatively impacting U.S. national security and create strategic surprise for U.S. adversaries by maintaining the technological superiority of the U.S. military,” reads like a transformation playbook.<sup>33</sup>

With its institutionalization and routinization, more energy and resources are now being put into doing transformation than into selling it. Just how revolutionary, transformational, and/or disruptive the enterprise will be is still to

28 Skeptics were puzzled as well to see transformation’s champions contrast the U.S. military’s operational practices with those of the private sector, as if the military were in competition with business.

29 On the turn to COIN, see John A. Nagl, *Learning to Eat Soup with a Knife: Counterinsurgency Lessons from Malaya and Vietnam* (Chicago: University of Chicago Press, 2005); David H. Ucko, *The New Counterinsurgency Era: Transforming the U.S. Military for Modern Wars* (Washington, DC: Georgetown University Press, 2009); James A. Russell, *Innovation, Transformation, and War: Counterinsurgency Operations in Anbar and Ninewa Provinces, Iraq, 2005–2007* (Stanford: Stanford University Press, 2011); and Chad C. Serena, *A Revolution in Military Adaptation: The U.S. Army in the Iraq War* (Washington, DC: Georgetown University Press, 2011).

30 The unexpected return to COIN may have been more disruptive for the U.S. military than the transformation enterprise has been.

31 H. R. McMaster, “The Pipe Dream of Easy War,” *New York Times*, July 21, 2013, <http://www.nytimes.com/2013/07/21/opinion/sunday/the-pipe-dream-of-easy-war.html>. See also Robert D. Holzer, “Why Pentagon Must Embrace Transformation, This Time,” *Breaking Defense*, July 2, 2013, <http://breakingdefense.com/2013/07/02/why-pentagon-must-embrace-transformation-this-time/>.

32 Department of Defense, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, January 2012, [http://www.defense.gov/news/defense\\_strategic\\_guidance.pdf](http://www.defense.gov/news/defense_strategic_guidance.pdf).

33 Quote from “Our Work,” DARPA website, [http://www.darpa.mil/our\\_work/](http://www.darpa.mil/our_work/). On DARPA see Regina E. Dugan and Kaigham J. Gabriel, “Special Forces’ Innovation: How DARPA attacks Problems,” *Harvard Business Review* 91 (2013), <http://hbr.org/2013/10/special-forces-innovation-how-darpa-attacks-problems/ar/1>.

be determined; it remains a work in progress. Yet enterprise champions can credibly lay claim to progress, to the initial realization of at least elements of their vision. Already, U.S. assets are extensively networked. The U.S. military is well on the way to networks of networks and systems of systems. AirSea Battle reads like the successor to, and the operationalization of, network-centric warfare. Conventional Prompt Global Strike may well reshape the relationship between nuclear and conventional capabilities. VADM Cebrowski's much maligned "Streetfighter" has morphed into the LCS, a prominent component of the U.S. Navy's surface combatant force transformation strategy. Reliance on unmanned systems, particularly UAVs (aka drones), has steadily increased. Organizational and cultural change, including new career paths and what it means to be a "pilot," has followed. Not insignificant operational challenges, such as the seamless integration of manned and unmanned systems, remain, but missions once thought unimaginable or impossible are now being accomplished.<sup>34</sup>

Perhaps the most striking progress has occurred in the cyber realm. A U.S. Cyber Command (CYBERCOM) was stood up in 2010. Charged with "planning, coordinating, integrating, synchronizing, and directing activities to operate and defend the Department of Defense information networks," it is also responsible, "when directed," for the conduct of "full-spectrum military cyberspace operations (in accordance with all applicable laws and regulations) [sic] in order to ensure U.S. and allied freedom of action in cyberspace, while denying the same to our adversaries."<sup>35</sup> CYBERCOM is not only to "counter cyberspace threats" but "assure access to cyberspace." It is in the process of standing up 40 "cyberwarfare" teams, 27 for defense and 13 for offense.<sup>36</sup> Service cyber commands—Army Cyber Command, Fleet Cyber Command, Air Force Cyber Command, Marine Forces Cyber Command—have been established as well. Even while it has raised concerns about the cyber operations of others, the United States, with its defensive and offensive cyber operations capabilities, has positioned itself for, and evidently already engaged in, a new kind of war in a new dimension of the battlespace that has the game-changing potential of rendering "previous methods of conducting war obsolete or subordinate," displacing "one form of war with another," and fundamentally changing the way war is waged.<sup>37</sup> As with unmanned systems, missions once thought unimaginable or impossible are now being accomplished.

## Conclusions

Much of U.S. defense innovation today can be characterized as sustaining, essentially routine, incremental, near-continuous improvements in or tweaks of existing technology, doctrine, and organization. It amounts to modernization, or perhaps modernization-plus. For modernizers, sustaining innovation is sufficient. For transformers and revolutionaries, and their comrades at DARPA, however, the aggressive exploitation of new, emerging, and over-the-horizon technologies, particularly rapidly advancing information technologies, promises something more: discontinuous, disruptive technological and operational breakthroughs, the creation of operational and strategic surprise, even transformational, revolutionary change. An indication of what can be accomplished more broadly is evident in the breakthroughs already demonstrated with unmanned and cyber operations.

Sequestration unchecked will impose not inconsequential constraints on U.S. defense innovation. The U.S. defense establishment is unlikely to be able to proceed with across-the-board modernization, as it is inclined to do. Priorities—strategic priorities—will have to be established; choices—strategic choices—will have to be made. That should be welcomed. Sequestration-induced austerity provides the opportunity for advocates of a smaller, leaner, faster, more lethal force to sharpen the focus of U.S. defense innovation.

34 See P. W. Singer, *Wired for War: The Robotics Revolution and Conflict in the 21st Century* (New York: Penguin Press, 2009).

35 Quote from "U.S. Cyber Command," U.S. Strategic Command website, [http://www.stratcom.mil/factsheets/Cyber\\_Command/](http://www.stratcom.mil/factsheets/Cyber_Command/).

36 David E. Sanger, "In Closely Held Project, Military to Deploy Units Trained in Cyberwarfare," *New York Times*, July 19, 2013; and "Remarks by Deputy Secretary of Defense Carter at the Aspen Security Forum at Aspen, Colorado," July 18, 2013, transcript, <http://www.defense.gov/transcripts/transcript.aspx?transcriptid=5277>.

37 As envisioned in Department of Defense, *Quadrennial Defense Review Report* (Washington, DC: Department of Defense, 2001), 29.